Focus on Space Communications Resiliency

The ESA/Cebreros Experience

L. HERNANDEZ – ESA Cebreros/Villafranca Station Manager

Issue/Revision: 1.0
Reference: n/a
Status: Approved

ESTRACK

ESA operates a **worldwide Network** of ground stations, distributed over four continents, allowing for a global coverage.

The geographical distribution of the ground stations around the Earth ensures that at almost any point in time, tracked satellites can be in contact with their Control Centre via one of the stations

ESA Tracking Network: Global Coverage

The 15m Network

These antennas are multi-purpose and cover both the S-Band (2 GHz) and the X-Band (8 GHz). They are suitable for all types of orbits and trajectories

The 35m Network (Deep Space)

These antennas, of most advanced technology, are specially designed to support interplanetary deep space missions, as well as far Near Earth missions (Moon, Lagrange)

Cebreros Infrastructure

- About **95 000 m²**

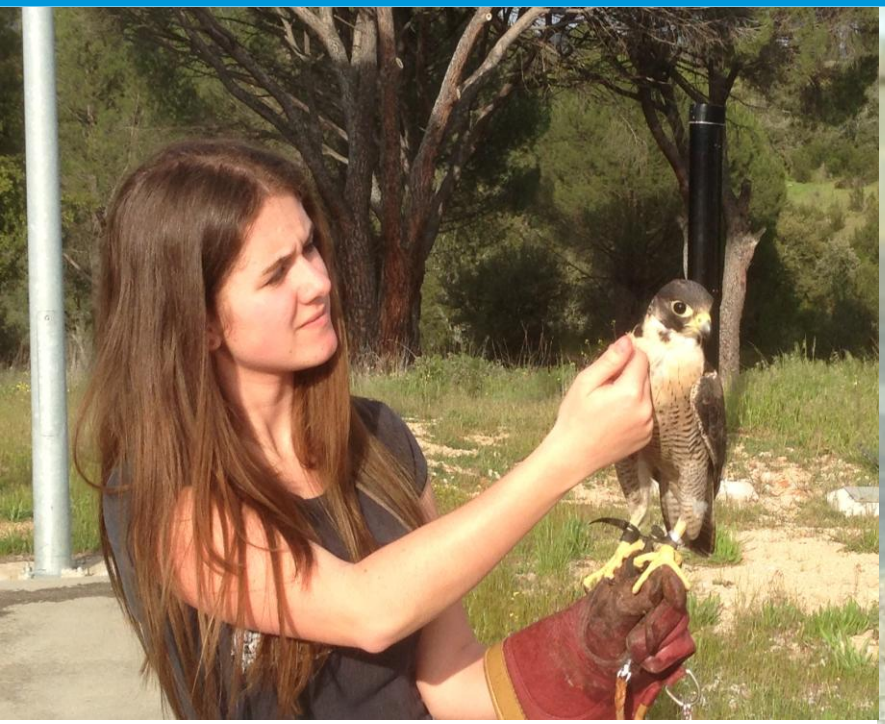
- **7 buildings:**
  - Operations(~2000 m²)
  - Power Plant
  - Workshop and Storage
  - Fire Fighting
  - Water Treatment
  - Antenna
  - CESAR Optical Telescope
  - SSA Telescope

- Limited exposure to neighbor and natural events except forest fire risk and lightning

Natural Events

- **Lightning**
  - Few strikes in 2006 with substantial damages
  - Improvement in 2007 and nothing since
- **Natural Reserve around the station**
  - Bird migration
  - Bird nesting and defecating on the antenna and mirror system

Hawking



Forest Fire Risk

Forest Fire Risk

Big Forest Fire in August 2013

- Limited impact due to:
  - Good Station Fire Break and the regular maintenance performed to clean the site to avoid the vegetation growing,
  - Most dangerous part of the fire was contained outside the station perimeter.
  - Cebreros Fire Brigade reaction was very good and two "brigades" were constantly present in the station during the critical phase.
- Because of the wind, some inflamed branches were projected inside the station perimeter and inflamed low vegetation parts; quite impressive to see but not really dangerous.
- Our fire fighting system (pump and hydrants) worked fine and the fire brigade regularly fed their tanks from our water tanks.

In conclusion, the risk for the station was very high and no damage has occurred thanks to our maintenance activity, both on the fire break and cleaning the grounds.


esa